

# TERMINAL BOX OF MAIN ELECTRIC MOTOR FOR VEHICLE

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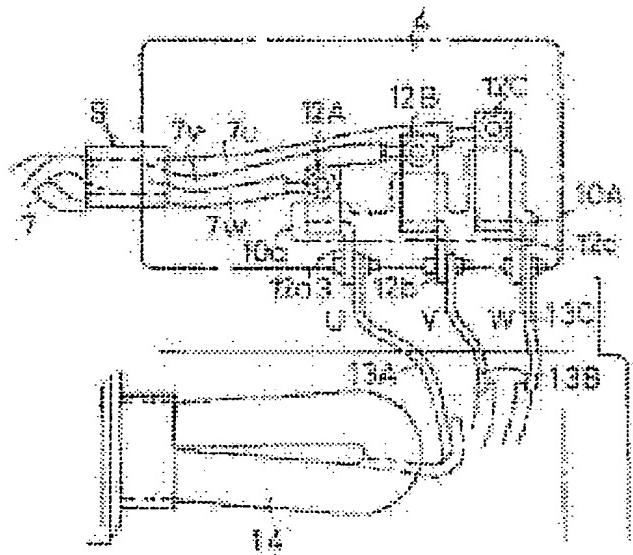
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## Abstract of JP 10243601 (A)

**PROBLEM TO BE SOLVED:** To prevent noise entering from a main circuit cable, and facilitate connection work. **SOLUTION:** In a terminal box 4, a terminal block 10A is stored. In this terminal block 10A, terminals 12A, 12B, 12C are integrally formed by an epoxy resin-made terminal base 10a. In each terminal 12A, 13B, 12C, L-shaped terminals of long and short bottom parts are progressively provided as connection parts. Of the connection parts, the connection part of the terminal 12B to which a core wire 7v of the V phase is connected is higher than that of the terminal 12A of the U phase. Further, the connection part of the terminal 12C of the W phase is higher than the connection part of the V phase. Each core wire 7u, 7v, 7w is connected successively in order of U phase, V phase, W phase, so as to prevent crossing of the core wires inside the terminal box, and hence connection work is facilitated.



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**CLAIMS**

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**[Claim(s)]**

[Claim 1]A terminal box of a main motor for vehicles characterized by comprising the following.

The 1st terminal area to which two or more core wire terminals to which a core wire of an A phase of a multi-conductor cable is connected protrude on one side of a pars basilaris ossis occipitalis.

The 2nd terminal area by which two or more core wire terminals to which a core wire of a B phase of said multi-conductor cable is connected protrude from one side of said pars basilaris ossis occipitalis stair-like with a core wire terminal of said 1st terminal area, and proximal is carried out to said 1st terminal area.

The 3rd terminal area by which two or more core wire terminals to which a core wire of C phase of said multi-conductor cable is connected protrude from one side of a pars basilaris ossis occipitalis stair-like with a core wire terminal of said 1st and 2nd terminal area, and proximal is carried out to said 2nd terminal area.

[Claim 2]A terminal box of the main motor for vehicles according to claim 1 protruding on other sides of said pars basilaris ossis occipitalis a common terminal connected to a stator winding.

[Claim 3]A terminal box of the main motor for vehicles according to claim 1 or 2 having left a terminal area and carrying out pre-insulation of said 1st terminal area, said 2nd terminal area, and said 3rd terminal area by cast molding.

[Claim 4]A terminal box of a main motor for vehicles characterized by comprising the following.

Said 1st terminal area, said 2nd terminal area, and said 3rd terminal area.

A box which stores these 1st, 2nd, and 3rd terminal area.

[Claim 5]A terminal box of the main motor for vehicles according to any one of claims 1 to 4 forming said 1st, 2nd, and 3rd terminal area with a strip plate.

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

[Field of the Invention] This invention relates to the terminal box of the main motor for vehicles.

**[0002]**

[Description of the Prior Art] Drawing 6 (b) is a figure showing an example of the terminal box of the conventional main motor for vehicles, and shows the state where covering was removed. Drawing 6 (a) shows the left side view of drawing 6 (b). In drawing 6, the terminal 22A of U phase, and the terminal 22B of V phase and the terminal 22C of W phase which are connected to the stator winding which the three-phase induction motor as a main motor for vehicles does not illustrate protrude on the inside of the terminal box 4B of the rectangle shown with a broken chain line at equal intervals.

[0003] On the other hand, the three rubber bushing 9 is installed through the left end of the terminal box 4B. In these rubber bushing 9, the 3 core cable 7 penetrates beforehand, and to it the core wire 7u of R phase among the core wires of the three core each cable 7, It is connected to the terminal 22A via a pressure terminal, and, similarly, as for the core wire of W phase, the core wire 7v of V phase is connected to the terminal 22B via the pressure terminal at the terminal 22C, respectively.

[0004] As shown in drawing 6 (a) in which the left side view of drawing 6 (b) is shown, the three core each cable 7 comprises a stranded wire of each core wire of R phase, an S phase, and W phase, and is connected to the output side of the inverter power of the variable voltage variable frequency stored by the head vehicle of the train in which this three-phase induction motor was carried.

[0005] By the way, besides the inverter power mentioned above in the head vehicle which carried out point \*\*, Automatic train control (ATC:Automatic Train Control Device) is stored, and operation commands, such as instructions of the brake of each vehicles, etc. and an interval with a precedence train, are inputted into this automatic train control by a subcarrier via a rail from a terrestrial device.

[0006]

[Problem(s) to be Solved by the Invention]However, since harmonic content is contained, this harmonic content invades into automatic train control as a noise, and a possibility of making automatic train control malfunctioning is among the current which flows into the stator winding of this three-phase induction motor.

[0007]Therefore, as drawing 6 showed, in order to use a multi-conductor cable for each cable 7 and to reduce the noise mentioned later, the core wire of U phase, V phase, and W phase is built into each cable.

[0008]Therefore, the core wires 7u, 7v, and 7w linked to each terminals 22A, 22B, and 22C of the terminal box 4B must cross and lap in the center portion of the terminal box 4B, and their thickness of the space direction crossing at a right angle in drawing 6 (b) must increase, and the workability of connection work not only must fall, but they must increase the depth of the terminal box 4B.

[0009]And this work must be done at the dark and narrow place surrounded with a lower cart, a wheel, etc. of the body, and, in maintenance and check, must be performed for a short time. Since a connection path is not known only by glancing for the core wire which crossed and became complicated when checking after wiring, it takes time.

[0010]Thus, although the signal wire in which the reason for building the core wire for a three phase into each cable was allocated inside automatic train control is separated from a main circuit cable and allocated, it is because there is a limitation and invasion of a noise cannot be thoroughly prevented in the space where the head part of the head vehicle was still restricted. Then, the purpose of this invention is to obtain the terminal box of the main motor for vehicles which can prevent invasion of a noise and can perform connection work and confirmation work easily.

[0011]

[Means for Solving the Problem]It is characterized by a terminal box of a main motor for vehicles of \*\* comprising the following at claim 1 in written this invention.

The 1st terminal area to which two or more core wire terminals to which a core wire of an A phase of a multi-conductor cable is connected protrude on one side of a pars basilaris ossis occipitalis.

The 2nd terminal area by which two or more core wire terminals to which a core wire of a B phase of a multi-conductor cable is connected protrude from one side of a pars basilaris ossis occipitalis stair-like with a core wire terminal of the 1st terminal area, and proximal is carried out to the 1st terminal area.

The 3rd terminal area by which two or more core wire terminals to which a core wire of C phase of a multi-conductor cable is connected protrude from one side of a pars basilaris ossis occipitalis stair-like with a core wire terminal of the 1st and 2nd terminal area, and proximal is carried out to the 2nd terminal area.

[0012]A terminal box of a main motor for vehicles of the invention according to claim 2

protruded on other sides of a pars basilaris ossis occipitalis a common terminal connected to a stator winding.

[0013]A terminal box of a main motor for vehicles of the invention according to claim 3 left a terminal area, and carried out pre-insulation of the 1st terminal area, 2nd terminal area, and 3rd terminal area by cast molding.

[0014]It is characterized by a terminal box of a main motor for vehicles of \*\* comprising the following at claim 4 in written this invention.

The 1st terminal area, 2nd terminal area, and 3rd terminal area.

A box which stores these 1st, 2nd, and 3rd terminal area.

[0015]A terminal box of a main motor for vehicles of the invention according to claim 5 formed the 1st, 2nd, and 3rd terminal area with a strip plate.

[0016]In claim 1 and the invention according to claim 2 by such a means, Connection of each core wire is made in order of an A phase, a B phase, and C phase, and connection with the 2nd terminal area of a core wire of a B phase is made from the outside of a core wire of an A phase linked to the 1st terminal area, and is performed from the outside of a core wire of a B phase which also connected connection with the 3rd terminal area of a core wire of C phase to the 2nd terminal area.

[0017]In the invention according to claim 3, it is fixed to a main motor for vehicles via pre-insulation.

[0018]

[Embodiment of the Invention]Hereafter, one embodiment of the terminal box of the main motor for vehicles of this invention is described with reference to drawings. The figure and drawing 2 which drawing 1 shows one embodiment of the terminal box of the main motor for vehicles of this invention are a partial enlarged detail of drawing 1, it corresponds to drawing 6 shown by the Prior art, and drawing 3 is an A-A sectional view of drawing 2.

[0019]In drawing 1, drawing 2, and drawing 3, as the nose 2 shows drawing 1, it is set up by the upper bed of the stator frame 1 of a three-phase induction motor, and the terminal box 4A later mentioned by drawing 2 and drawing 3 is being fixed to the side on the right-hand side of the stator frame 1. In drawing 1 of the stator frame 1, the connecting end of the rotor axis 3 in which the taper part was formed protrudes on the right end.

[0020]On the left-hand side of the terminal box 4A, the cable support 5 of a couple which carried out the detailed abbreviation is arranged lengthwise, and the end of the cable 7 of three cores which penetrated this cable support 5 is connected to the inside of the terminal box 4A via the rubber bushing 9 installed through the left end of the terminal box 4A.

[0021]The cable support 6 is being horizontally fixed to the lower part of the stator frame 1. The high voltage connector 8 is connected to the lower end of the cable 7 shown with the dashed line supported with this cable support 6, and the cable connected to the main circuit power source which is not illustrated is connected to this high voltage connector 8.

[0022]In drawing 2 and drawing 3, the terminal block 10A by which cast molding was

carried out with the epoxy resin is being stored and fixed to the inside of the terminal box 4A. To four corners each of the terminal base 10a shown with a dashed dotted line by the product made of an epoxy resin, the filled metal 15 is laid underground and this terminal block 10A is being fixed to the pars basilaris ossis occipitalis of the terminal box 4A with the bolt inserted in this filled metal 15.

[0023]In the terminal base 10a, the 1st band-like long terminal area and the becoming terminal area 10b protrude on a sliding direction to a left end, and on the right-hand side of this terminal area 10b, Compared with the terminal area 10b, the 2nd high terminal area and the becoming terminal area 10c are formed, and the 3rd still higher terminal area and the becoming terminal area 10d are formed on the right-hand side of this terminal area 10c. The pars intermedia of the terminals 12A, 12B, and 12C shown with the enlarged drawing of drawing 4 is embedded beforehand at these terminal areas 10b, 10c, and 10d.

[0024]Among these, to the upper surface of the center section of the terminal 12a2 of L form with a long pars basilaris ossis occipitalis manufactured from rectangular copper wire, the terminal 12a1 of the short L form of a pars basilaris ossis occipitalis is set up, the terminal 12a1 is set up by the right-hand side front end in drawing 4, and the terminal 12A of left end U phase is brazed by the terminal 12a2, respectively. The terminal hole which serves as a terminal area for connecting the core wire of each cable via a pressure connector is formed in the terminal 12a1 and the upper bed of 12a2, respectively.

[0025]The upper bed of the terminal 12a3 of the L form manufactured from rectangular copper wire is brazed on the undersurface of the terminal 12a2. Compared with the terminal 12A, the pars intermedia of the terminal 12B of V phase with high bending height of a sliding direction is laid under the terminal area 10c on the right-hand side of the terminal 12A.

[0026]The terminal corresponding to the terminal 12a1 shown also in this terminal 12B by drawing 4 which is not illustrated is brazed, and the terminal corresponding to the terminal 12a3 is installed similarly. Similarly, the terminal 12C of W phase whose bending height of a sliding direction is still higher is laid under the terminal area 10d, and the terminal whose bending height is still higher protrudes on the upper surface of this terminal 12C.

[0027]Among these, in drawing 2, the core wire of U phase of the cable 7 which penetrated the left-hand side front end of the terminal box 4A for each terminal of the front end (near side), V phase, and W phase is connected to the terminal of a phase corresponding, respectively.

[0028]Similarly, in drawing 2, the core wire of U phase of each cable 7, V phase, and W phase is connected to each terminal of pars intermedia, and the terminal of the back end, respectively. As shown in drawing 3, the upper bed of the connection plates 13A, 13B, and 13C connected to the stator winding 14 of a three-phase induction motor is connected to the lower end of the terminal 12a3.

[0029]In the terminal box of the main motor for vehicles constituted in this way, connection of the core wire of each cable 7 is made from the terminal 12a1 of the left end where the

height of a terminal area is the lowest, and the core wire of U phase to 12a2. Next, the core wire of V phase is connected to the terminal area 10c of this right end, and, finally the core wire of W phase located in a right end is connected.

[0030]Therefore, connection of the core wire of V phase and W phase can be made on the right-hand side of the upper part of the core wire of other phases, and since obstacles, like a tool with a bundle hits the previously connected core wire are avoidable, connection becomes easy. Confirmation work after connection can be performed visually and can be carried out in a short time certainly.

[0031]In the above-mentioned example, although the terminals 12A, 12B, and 12C were constituted from the terminal 12a2 of the long L form of a pars basilaris ossis occipitalis, and the two terminals 12a1 with a short pars basilaris ossis occipitalis, The terminal 12a2 is made into the shape of a long U character of a pars basilaris ossis occipitalis, is fixing the one terminal 12a1 to this center section, and may form the terminal area of three core wires. In this case, there is an advantage which can reduce a brazing part.

[0032]Next, drawing 5 is a fragmentary perspective view showing a 2nd embodiment of the terminal box of the main motor for vehicles of this invention, and does not consider it as an one form by using as the terminal block 10A the terminal areas 10b, 10c, and 10d shown by drawing 2, but the case where it provides individually is shown.

[0033]Namely, in [ the tag block 16 of batten plate shape is laid under the terminal block 10B to the inside of a prismatic terminal base, and ] drawing 5 of this tag block 16, The back end by the side of the female of the three connection sockets 17 of a sex form is brazed to a left lateral, and the connection socket 17 is brazed downward [ one ] to a right end.

[0034]In the joint box of the main motor for vehicles constituted in this way, the three terminal blocks 10B are stored, and it is making the attaching position higher in V phase, W phase, and order than U phase, and connects in order of U phase, V phase, and W phase like the joint box shown by drawing 1, drawing 2, drawing 3, and drawing 4.

[0035]In this case, since this male side can be inserted in the female side and connection work can be performed by connecting the male side of the connection socket 17 at the tip of each core wire, connection work can be carried out further in a short time.

[0036]In the joint box of the main motor for vehicles constituted in this way, since the lap of the core wire in the inside of this joint box can be reduced and the projection amount from the stator frame of a joint box can be reduced, it becomes easy [ the attachment to a cart and removal ].

[0037]

[Effect of the Invention]As mentioned above, according to this invention, two or more core wire terminals to which the core wire of the A phase of a multi-conductor cable is connected receive the 1st terminal area that protrudes on one side of a pars basilaris ossis occipitalis, Two or more core wire terminals to which the core wire of the B phase of a multi-conductor cable is connected protrude from one side of a pars basilaris ossis occipitalis stair-like with

the core wire terminal of the 1st terminal area, and carry out proximal [ of the 2nd terminal area ]. By what two or more core wire terminals for which the core wire of C phase of a multi-conductor cable is connected do to the core wire terminal of the 1st and 2nd terminal area for proximal [ of the 3rd terminal area that protrudes from one side of a pars basilaris ossis occipitalis stair-like ]. Make connection of each core wire in order of an A phase, a B phase, and C phase, and the connection with the 2nd terminal area of the core wire of a B phase, Since it carried out from the outside of the core wire of an A phase linked to the 1st terminal area and connection with the 3rd terminal area of the core wire of C phase was also made from the outside of the core wire of a B phase linked to the 2nd terminal area, invasion of a noise can be prevented and the terminal box of the main motor for vehicles which can perform connection work easily can be obtained.

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

[Drawing 1]The figure showing a 1st embodiment of the terminal box of the main motor for vehicles of this invention.

[Drawing 2]The partial enlarged detail of drawing 1.

[Drawing 3]The A-A sectional view of drawing 2.

[Drawing 4]Drawing 2 and the partial expansion perspective view of drawing 3.

[Drawing 5]The fragmentary perspective view showing a 2nd embodiment of the terminal box of the main motor for vehicles of this invention.

[Drawing 6]The figure showing an example of the terminal box of the conventional main motor for vehicles.

**[Description of Notations]**

1 [ -- A terminal box, 5, 6 / -- Cable support, ] -- A stator frame, 2 -- Nose, 3 -- A rotor axis, 4A 7 [ -- Rubber bushing, ] -- A cable, 7u, 7v, 7w -- A core wire, 8 -- A high voltage connector, 9 10A, 10B [ -- A pressure terminal 12A, 12B, 12C / -- A terminal 13A, 13B, 13C / -- A connection plate 14 / -- A stator coil 15 / -- Filled metal, 16 / -- A tag block 17 / -- Connection socket. ] -- A terminal block, 10a -- A terminal base, 10b, 10c, 10d -- A terminal area, 11

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**[Translation done.]**

**\* NOTICES \***

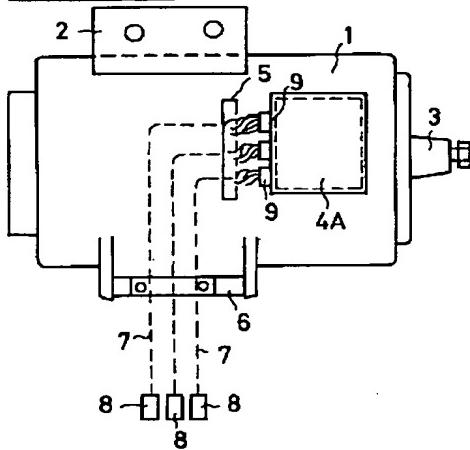
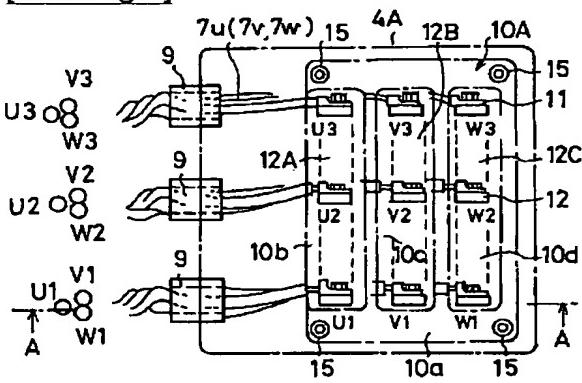
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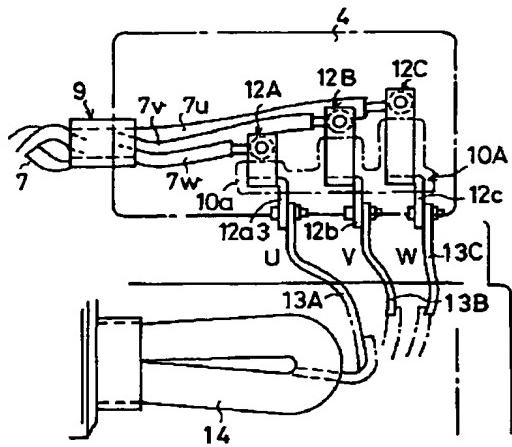
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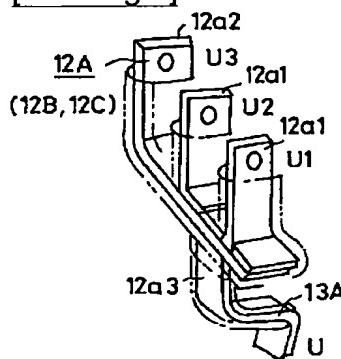
**DRAWINGS**

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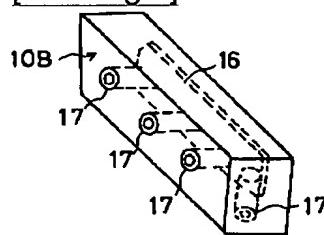
**[Drawing 1]****[Drawing 2]****[Drawing 3]**



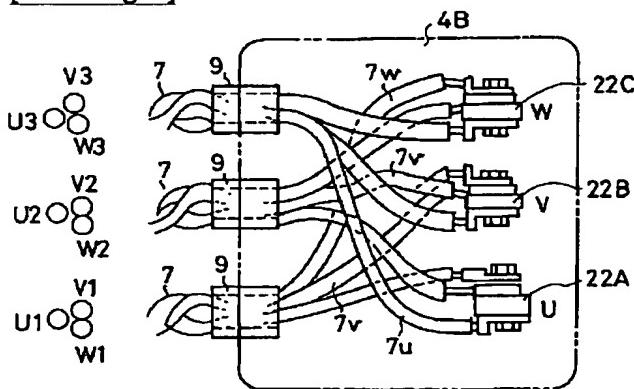
[Drawing 4]



[Drawing 5]



[Drawing 6]



(a)

(b)

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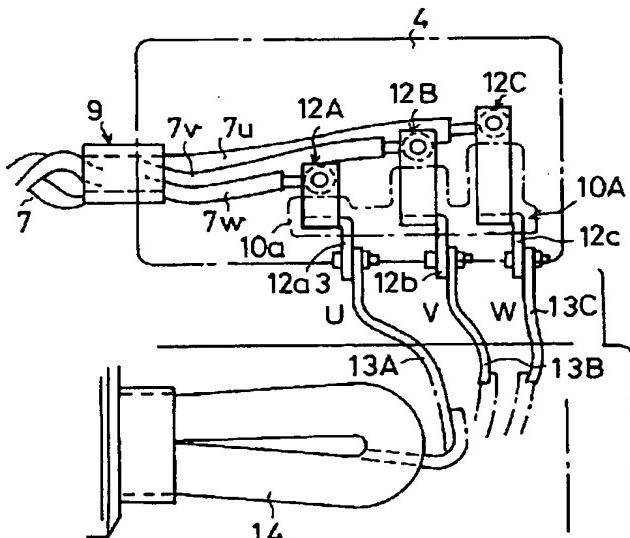
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(54)【発明の名称】車両用主電動機の端子箱

## (57)【要約】

【課題】主回路ケーブルから侵入するノイズを防ぎ、接続作業も容易にする。

【解決手段】端子箱4の内部に端子台10Aを収納する。この端子台10Aは、端子12A, 12B, 12Cをエポキシ樹脂製の端子ベース10aで一体にする。各端子12A, 12B, 12Cには、底部の長いL形の端子と底部の短いL形の端子を接続部として突設する。このうち、V相の芯線7vが接続される端子12Bの接続部は、U相の端子12Aよりも高くする。さらに、W相の端子12Cの接続部は、V相の接続部よりも高くする。各芯線7u, 7v, 7wの接続は、U相, V相, W相の順で行うことで、端子箱の内部における芯線の交差を防ぎ、接続作業を容易にする。



## 【特許請求の範囲】

【請求項1】 多芯ケーブルのA相の芯線が接続される複数の芯線端子が底部の片側に突設される第1の端子部と、前記多芯ケーブルのB相の芯線が接続される複数の芯線端子が前記第1の端子部の芯線端子と階段状に前記底部の片側から突設され前記第1の端子部に隣設される第2の端子部と、前記多芯ケーブルのC相の芯線が接続される複数の芯線端子が前記第1、第2の端子部の芯線端子と階段状に底部の片側から突設され前記第2の端子部に隣設される第3の端子部とを備えた車両用主電動機の端子箱。

【請求項2】 固定子巻線に接続される共通端子を前記底部の他側に突設したことを特徴とする請求項1に記載の車両用主電動機の端子箱。

【請求項3】 前記第1の端子部及び前記第2の端子部並びに前記第3の端子部を接続部を残して注型成形で絶縁被覆したことを特徴とする請求項1又は請求項2に記載の車両用主電動機の端子箱。

【請求項4】 前記第1の端子部及び前記第2の端子部並びに前記第3の端子部と、これらの第1、第2、第3の端子部を収納する箱体とを備えたことを特徴とする車両用主電動機の端子箱。

【請求項5】 前記第1、第2、第3の端子部を帯状板で形成したことを特徴とする請求項1乃至請求項4のいずれかに記載の車両用主電動機の端子箱。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、車両用主電動機の端子箱に関する。

## 【0002】

【従来の技術】図6(b)は、従来の車両用主電動機の端子箱の一例を示す図で、カバーを外した状態を示す。また、図6(a)は、図6(b)の左側面図を示す。図6において、鎖線で示す長方形の端子箱4Bの内部には、車両用主電動機としての三相誘導電動機の図示しない固定子巻線に接続される、U相の端子22A、V相の端子22BとW相の端子22Cが等間隔に突設されている。

【0003】一方、端子箱4Bの左端には、3個のゴムブッシング9が貫設されている。これらのゴムブッシング9には、三芯ケーブル7があらかじめ貫通し、各三芯ケーブル7の芯線のうち、R相の芯線7uは、圧着端子を介して端子22Aに接続され、V相の芯線7vは同じく端子22Bに、W相の芯線は、端子22Cに圧着端子を介してそれぞれ接続されている。

【0004】各三芯ケーブル7は、図6(b)の左側面図を示す図6(a)に示すように、R相、S相、W相の各芯線の撚線で構成され、この三相誘導電動機が搭載された列車の先頭車両に収納された可変電圧可変周波数のインバータ電源の出力側に接続されている。

【0005】ところで、先述した先頭車両には、前述し

たインバータ電源の他に、自動列車制御装置(ATC: Automatic Train Control Device)が収納され、この自動列車制御装置には、各車両のブレーキなどの指令や、先行列車との間隔などの運行指令が地上の装置からレベルを介して搬送波で入力される。

## 【0006】

【発明が解決しようとする課題】ところが、この三相誘導電動機の固定子巻線に流れる電流には、高調波成分が含まれているので、この高調波成分が自動列車制御装置にノイズとして侵入して、自動列車制御装置を誤動作させるおそれがある。

【0007】したがって、図6で示したように、各ケーブル7には多芯ケーブルを使用し、後述するノイズを減らすために、各ケーブルにU相、V相、W相の芯線を組み込んでいる。

【0008】そのため、端子箱4Bの各端子22A、22B、22Cに接続する芯線7u、7v、7wは、端子箱4Bの中央部分で交差して重なり、図6(b)における紙面直交方向の厚みが増えて接続作業の作業性が低下する20だけでなく、端子箱4Bの深さも増やすなければならぬ。

【0009】しかも、この作業は、車体の下側の台車や車輪などで囲まれた暗くて狭い場所で行わなければならず、保守・点検の場合には短時間に行わなければならない。また、配線後に確認するときには、交差し錯綜した芯線のために、一見しただけでは接続経路が分らないので、時間がかかる。

【0010】このように、各ケーブルに三相分の芯線を組み込む理由は、自動列車制御装置の内部に配設された信号線は、主回路ケーブルと離して配設されているが、それでも先頭車両の先頭部の限られた空間では限りがあり、ノイズの侵入を完全に防ぐことはできないためである。そこで、本発明の目的は、ノイズの侵入を防ぎ、接続作業と確認作業を容易に行うことのできる車両用主電動機の端子箱を得ることである。

## 【0011】

【課題を解決するための手段】請求項1に記載の発明の車両用主電動機の端子箱は、多芯ケーブルのA相の芯線が接続される複数の芯線端子が底部の片側に突設される40第1の端子部と、多芯ケーブルのB相の芯線が接続される複数の芯線端子が第1の端子部の芯線端子と階段状に底部の片側から突設され第1の端子部に隣設される第2の端子部と、多芯ケーブルのC相の芯線が接続される複数の芯線端子が第1、第2の端子部の芯線端子と階段状に底部の片側から突設され第2の端子部に隣設される第3の端子部とを備えたことを特徴とする。

【0012】また、請求項2に記載の発明の車両用主電動機の端子箱は、固定子巻線に接続される共通端子を底部の他側に突設したことを特徴とする。

【0013】また、請求項3に記載の発明の車両用主電

動機の端子箱は、第1の端子部及び第2の端子部並びに第3の端子部を接続部を残して、注型成形で絶縁被覆したことを特徴とする。

【0014】また、請求項4に記載の発明の車両用主電動機の端子箱は、第1の端子部及び第2の端子部並びに第3の端子部と、これらの第1、第2、第3の端子部を収納する箱体とを備えたことを特徴とする。

【0015】さらに、請求項5に記載の発明の車両用主電動機の端子箱は、第1、第2、第3の端子部を帯状板で形成したことを特徴とする。

【0016】このような手段によって、請求項1及び請求項2に記載の発明においては、各芯線の接続はA相、B相、C相の順に行い、B相の芯線の第2の端子部への接続は、第1の端子部に接続したA相の芯線の外側から行い、C相の芯線の第3の端子部への接続も、第2の端子部に接続したB相の芯線の外側から行う。

【0017】また、請求項3に記載の発明においては、絶縁被覆を介して車両用主電動機に固定される。

【0018】

【発明の実施の形態】以下、本発明の車両用主電動機の端子箱の一実施形態を図面を参照して説明する。図1は、本発明の車両用主電動機の端子箱の一実施形態を示す図、図2は、図1の部分拡大詳細図で、従来の技術で示した図6に対応し、図3は、図2のA-A断面図である。

【0019】図1、図2及び図3において、三相誘導電動機の固定子枠1の上端には、ノーズ2が図1に示すように立設され、固定子枠1の右側の側面には、図2、図3で後述する端子箱4Aが固定されている。また、固定子枠1の図1において右端には、テープ部が形成された回転子軸3の接続端が突設されている。

【0020】端子箱4Aの左側には、詳細省略した一对のケーブル支え5が縦設され、このケーブル支え5を貫通した三芯のケーブル7の端部は、端子箱4Aの左端に貫設されたゴムブッシング9を介して、端子箱4Aの内部に接続されている。

【0021】固定子枠1の下部には、ケーブル支え6が横に固定されている。このケーブル支え6で支えられた破線で示すケーブル7の下端には、高圧コネクタ8が接続され、この高圧コネクタ8には、図示しない主回路電源に接続されるケーブルが接続されている。

【0022】図2及び図3において、端子箱4Aの内部には、エポキシ樹脂で注型成形された端子台10Aが収納され固定されている。この端子台10Aは、エポキシ樹脂製で一点鎖線で示す端子ベース10aの各四隅に対して、埋金15が埋設され、この埋金15に挿入されたボルトで端子箱4Aの底部に固定されている。

【0023】端子ベース10aには、左端に対して上下方向に長い帯状の第1の端子部となる端子部10bが突設され、この端子部10bの右側には、端子部10bと比べて高

い第2の端子部となる端子部10cが形成され、この端子部10cの右側には、更に高い第3の端子部となる端子部10dが形成されている。これらの端子部10b、10c、10dには、図4の拡大図で示す端子12A、12B、12Cの中間部があらかじめ埋め込まれている。

【0024】このうち、左端のU相の端子12Aは、平角銅線から製作された底部が長いL形の端子12a2の中央部の上面に対して、底部の短いL形の端子12a1が立設され、図4において右側前端にも、端子12a1が立設され、端子12a2にそれぞれろう付されている。端子12a1、12a2の上端には、圧縮端子を介して各ケーブルの芯線を接続するための接続部となる端子穴がそれぞれ形成されている。

【0025】端子12a2の下面には、平角銅線から製作されたL形の端子12a3の上端がろう付されている。端子12Aの右側の端子部10cには、端子12Aと比べて上下方向の折り曲げ高さが高いV相の端子12Bの中間部が埋設されている。

【0026】この端子12Bにも、図4で示した端子12a1に対応する図示しない端子がろう付され、端子12a3に対応する端子も同様に垂設されている。同じく、端子部10dには、上下方向の折り曲げ高さが更に高いW相の端子12Cが埋設され、この端子12Cの上面にも、折り曲げ高さが更に高い端子が突設されている。

【0027】このうち、図2において、前端（手前側）の各端子には、端子箱4Aの左側前端を貫通したケーブル7のU相、V相及びW相の芯線が、それぞれ対応する相の端子に接続されている。

【0028】同じく、図2において、中間部の各端子と、後端の端子にも各ケーブル7のU相、V相、W相の芯線がそれぞれ接続されている。なお、端子12a3の下端には、図3に示すように、三相誘導電動機の固定子巻線14に接続される接続板13A、13B、13Cの上端が接続されている。

【0029】このように構成された車両用主電動機の端子箱においては、各ケーブル7の芯線の接続は、端子部の高さが最も低い左端の端子12a1、12a2に対するU相の芯線から行う。次に、この右端の端子部10cに対してV相の芯線を接続し、最後に、右端に位置するW相の芯線の接続を行う。

【0030】したがって、V相とW相の芯線の接続は、他の相の芯線の上部の右側で行うことができ、先に接続した芯線に締付工具が当たるなどの障害を回避することができるので、接続が容易となる。また、接続後の確認作業は、目視で行うことができ、短時間に確実に行うことができる。

【0031】なお、上記実施例において、底部の長いL形の端子12a2と底部の短い2個の端子12a1で端子12A、12B、12Cを構成したが、端子12a2は底部の長いU字状とし、この中央部に対して1個の端子12a1を固

定することで、3本の芯線の接続部を形成してもよい。この場合には、ろう付箇所を減らすことができる利点がある。

【0032】次に、図5は、本発明の車両用主電動機の端子箱の第2の実施形態を示す部分斜視図で、図2で示した端子部10b, 10c, 10dを端子台10Aとして一体形とせず、個別に設けた場合を示す。

【0033】すなわち、端子台10Bには、角柱状の端子ベースの内部に対して、帯板状の端子板16が埋設され、この端子板16の図5において、左側面に対して、雌雄形の3個の接続ソケット17の雌側の後端をろう付し、右端に対して接続ソケット17を下向きに1個ろう付している。

【0034】このように構成された車両用主電動機の接続箱においては、端子台10Bを3本収納し、その取付位置をU相よりもV相、W相と順に高くすることで、図1, 図2, 図3及び図4で示した接続箱と同様にU相、V相、W相の順に接続する。

【0035】この場合には、各芯線の先端に接続ソケット17の雄側を接続することで、この雄側を雌側に挿入して接続作業を行うことができるので、接続作業を更に短時間に行うことができる。

【0036】このように構成された車両用主電動機の接続箱においては、この接続箱の内部における芯線の重なりを減らすことができ、接続箱の固定子枠からの突出量を減らすことができるので、台車への取付け、取外しも容易となる。

#### 【0037】

【発明の効果】以上、本発明によれば、多芯ケーブルのA相の芯線が接続される複数の芯線端子が底部の片側に突設される第1の端子部に対して、多芯ケーブルのB相

の芯線が接続される複数の芯線端子が第1の端子部の芯線端子と階段状に底部の片側から突設され第2の端子部を隣設し、さらに、多芯ケーブルのC相の芯線が接続される複数の芯線端子が第1, 第2の端子部の芯線端子と階段状に底部の片側から突設される第3の端子部を隣設することで、各芯線の接続はA相、B相、C相の順に行い、B相の芯線の第2の端子部への接続は、第1の端子部に接続したA相の芯線の外側から行い、C相の芯線の第3の端子部への接続も、第2の端子部に接続したB相の芯線の外側から行ったので、ノイズの侵入を防ぎ、接続作業を容易に行うことのできる車両用主電動機の端子箱を得ることができる。

#### 【図面の簡単な説明】

【図1】本発明の車両用主電動機の端子箱の第1の実施形態を示す図。

【図2】図1の部分拡大詳細図。

【図3】図2のA-A断面図。

【図4】図2及び図3の部分拡大斜視図。

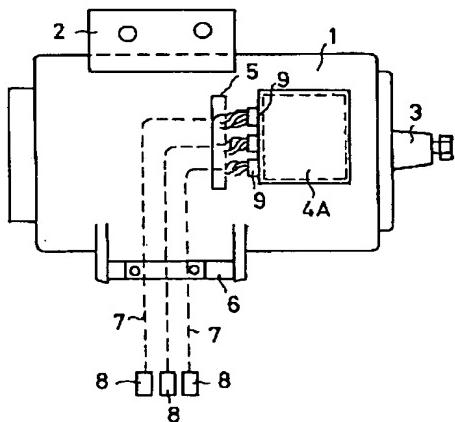
【図5】本発明の車両用主電動機の端子箱の第2の実施形態を示す部分斜視図。

【図6】従来の車両用主電動機の端子箱の一例を示す図。

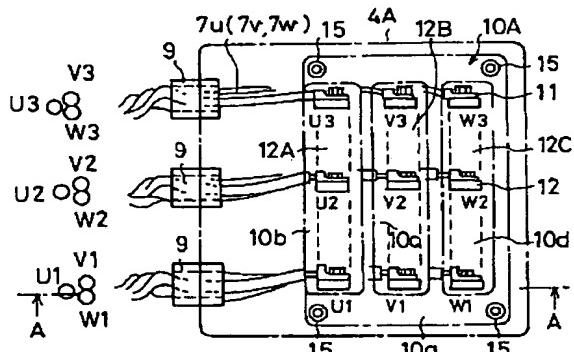
#### 【符号の説明】

1…固定子枠、2…ノーズ、3…回転子軸、4A…端子箱、5, 6…ケーブル支え、7…ケーブル、7u, 7v, 7w…芯線、8…高圧コネクタ、9…ゴムブッシング、10A, 10B…端子台、10a…端子ベース、10b, 10c, 10d…端子部、11…圧着端子、12A, 12B, 12C…端子、13A, 13B, 13C…接続板、14…固定子コイル、15…埋金、16…端子板、17…接続ソケット。

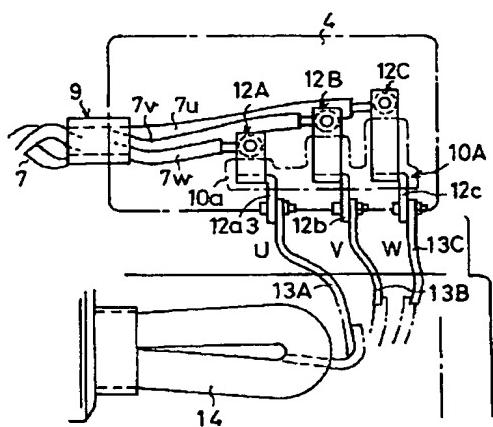
【図1】



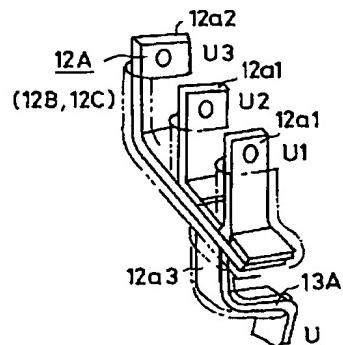
【図2】



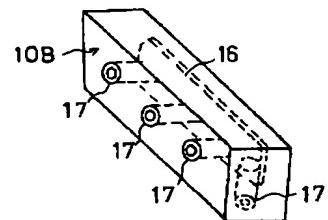
【図3】



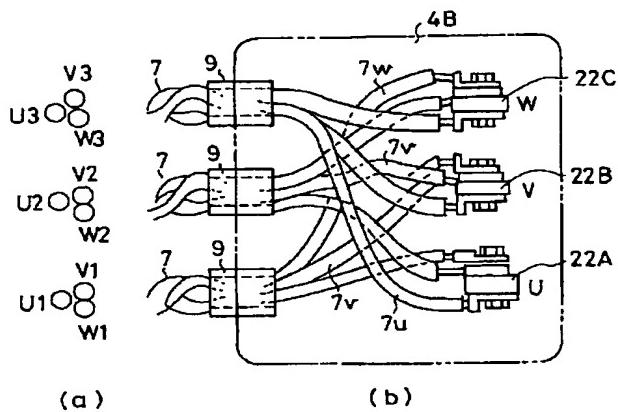
【図4】



【図5】



【図6】



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